

New Aspects of Challenges and Opportunities of Biomedical Information Access in Cyber Age in India

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Abstract:

Information paradigms of library users are being changed due to new style of publishing, availability and retrieval of information in the present digital era. Preferred form and formats of information, effect of electronic age on reading, satisfaction with existing ICT infrastructure of biomedical libraries, relatively significant features of print/electronic and other aspects have been discussed in this paper. The main objective is to analyse changes in respect to biomedical information access and library use. Simple random sampling has been applied for the sampling processes. Survey Monkey online service and Microsoft Excel have been used for data collection and data analysis software. The questionnaires were sent to 4379 persons via their email including students in which 526 questionnaires received were found eligible for study. It was found that electronic format is preferred for information search, but for reading print is more preferred than electronic. Satisfaction rate with ICT infrastructure of biomedical libraries is positive. Navigation and skipping is more common in electronic where underlining and annotation is more common in prints. Texts are favoured form of information accessed.

Key Words: Electronic Resources Print Resources, Online Resources, Reading Habits, Information Access, ICT Infrastructure, Audio Video Resources.

1. Introduction

Information is power and it creates impulse to move human society on advanced tracks of innovation and inventions. Use of Information Communication Technologies (ICTs) has changed the scenario of information publishing, access and use. In same accord, the libraries are also converting from being collection-centred

to service-oriented organizations. Electronic resources and automated services are getting more prominence herein with advancement of time. The growth rate of digital resources is significantly very high in comparison to existing printed one. If this trend continues few more years consequently as expected, a time is not far away when printed versions will get eclipsed but not totally abolished. The present study deals with biomedical information which has some specialties in terms of being a technology-oriented domain and require of up-to-date information and technologies thirst users towards electronic resources. In context of biomedicine, everything is related to life and death hence it's essential for libraries to provide pinpointed information expeditiously. Very few studies are based on biomedical information users and libraries in India in spite of impact of the same being not less on the society dealing directly with issues of human health and hygiene.

1.1. Need of the Study: It is an accepted fact that Gutenberg's invention of printing press was a great leap towards the information generation, storage and communication. However, the invention of Internet is equally great leap towards scholarly digital communication in the cyber age. It is needless to say that the Internet filled gap of time (24X7) and space i.e. irrespective of geographical location. All type of information services has been changed drastically due to introduction of the same. Libraries are important information intermediaries among the knowledge society in the world. These avail specified sources of information to users to search and access the same. Libraries are symbol of reading and study culture and benefit the society with its vivid and varied collections – may be it electronic or print. Success of a library depends upon the appropriateness of the collections and services offered by it to its users. Therefore needs arises to be aware of users interests towards latest technologies and information sources and resources. Studies on user groups are less and generally centred on information seeking behaviour of users only. Studies on biomedical information are rare in Indian scenario in spite of presence of large number of biomedical information users with varied age, designations and professional fields. This situation creates a

need to explore various aspects of information access and use in present digital era in India.

1.2. Objectives: The digital sources of information have totally changed the ways of scholarly communications which is not so fast in prior existing printed one. The principle objectives of this study are:

1. To formulate information access patterns of the biomedical professionals in present cyber age.
2. To analyse the new aspects of information seeking behaviour of biomedical information users in cyber age in India.
3. To analyse if age, gender and designation levels affect the information access by biomedical information users.
4. To derive the trends of use of electronic resources in Biomedical Information Centres & Libraries (ICLs) and recommend suitable measures to cope present needs of users.

1.3. Research Problems: Based on the objectives mentioned above, following are the questions that were proposed to be answered appropriately in Indian context after the study:

1. What are status of prints/electronic in biomedical libraries for different types of resources?
2. What features of electronic dominates on the print and vice versa.
3. What effect is visible on reading habit due to introduction of digital era?
4. What is the effect of the Internet on information publishing?
5. How much patrons are satisfied with ICT infrastructure of biomedical libraries?

1.4. Scope and Limitations: The study is based on biomedical professionals in India. It includes faculty members, scientists, research scholars, nurses, laboratory assistants, technicians and students etc. as respondents. The questionnaires were sent through the Internet via emails assuming that most of the biomedical professionals are information literate. Hence this study is limited to urban area and

information literate professionals. Simple random sampling method and easily availability of emails of people at higher designation levels makes this survey tended to the same. To mark differences due to differences in age, gender or designation level, comparisons based on ANOVA and chi-square has been followed.

2. Review of Literatures

King (2007) found that use of electronic format of information is being increased at a sharp rate during last some decades. According to his study, print was being used by 83% of users in 1977 that was reduced to 19% in 2007. Use of electronic was rare in 1977 that increased to being used by 75% of users in 2007. **Nagy** (2007) surveyed on book reading patterns in 2005 and compared it with result found in 1964, 1985 and 2000. She concluded the number of adults reading one book per year has decreased to 40 percent, and the number of adults lending books from the library has sunk to its third in the last forty years. **Hewiston** (2002) found the Internet as the most popular information source to the people as it gives instantaneous results and searching is easy at the same. He further clears that subscription based services presents complexity to the use of Internet. A survey by **Hannigan** (2007) confers that reading always or usually is preferred in print by nearly 60% of the users whereas only 21.5% users prefer to read always or usually in electronic. Survey was carried out among 2067 undergraduates and postgraduate students, faculty and staffs in University of Denver. Problems associated with the use of electronic books are related to large amount of text on a computer screen, but a reported benefit is that searching text in an electronic book is easier. **Velde & Ernest** (2009) reported that the number of downloads of Springer's e-books grew from 25 million in 2007 to 41 million in 2008 that shows expansion of use of electronic resources. **Alison et al** (2012) conclude that contextual and environmental factors influence the usage of e-resources and search capability of users should be good enough to make meaningful searches. Slow Internet connectivity and unreliable Internet connectivity have become less important problems up to this age, moreover inadequate Internet using skills are being felt more prominent reason to limited access of cyber resources **Sife** (2013).

Journals prove the largest used resources by users followed by conference proceedings and personal discussions **Parameshwar & Patil** (2009); **King** (2007); **Sharma & Singh** (2005). **Rogers** (2001) investigated a distinct increase of e-journals and decrease of print journals among the faculty members and M.A. students of Ohio State University during 1998 to 2000. Increase in use of electronic databases scored almost equal to increase in the number of e-journals there. **Jowkar & Dehghani** (2006) found that use of print journals was more than e-journals, but use frequency of e-journals was higher than the prints. E-journals received higher importance than print journals however. **Monopoli et al.** (2002) observed ease of use, availability, search possibilities in databases, ability to save and print the information were users' the most important reasons for using e-journals than print journals. Study was carried out among faculty members of Patras University. Decrease in the CD-ROM databases was noticed by **Moorthy & Karisidappa** (2001) in Indian universities and college libraries in 2001. They had observed that libraries were willing to switch to online databases to satisfy its users better.

Age proved as a factor in using e-format by users **Monopoli et. al** (12). Two thirds of the respondents (66%) preferred e-format, but only 40% of age group of 55-64 years preferred to use electronic version of journals one decade before. **Rogers** (2001) also found a very weak correlation between age and use of electronic vs. print journals. **Ming-der Wu & Shin-Chun Chen** (2011) discloses that students from humanities prefer printed books if both the formats of books are available to them. Medical students in contrary like to use e-book in compare to printed books. E-book used often is a step-by-step laboratory manual which is easily read from the screen. Weights of books also make students to abscond printed books and downloading electronic books as printed books are heavy to carry. They liked printed version only if the e-book was worthy of more depth reading.

3. Research Methodology

Survey technique was applied to collect the data for analyzing the results. Simple random sampling was used as the distribution of respondents did not seem continuous.

3.1. Population: There are more than 2000 scientists and 48000 faculty members working in various biomedical research institutes in India. Number of students in biomedical fields is almost 1.1 million. The number of physicians, nurses/midwife professionals, dentistry professionals, pharmaceutical professionals, community health workers, environmental health workers and psychiatrists are almost 0.75 million, 1.1 million, 93 thousand, 0.6 million, 50 thousand, zero and 3.7 thousand (15-19). Total four million of professionals can be concluded based upon number previously stated. Hence it was not possible to cover such huge population scattered in a wide geographical area following a stratified sampling. However comparative analysis was followed to study significant differences between various demographic groups based on age, gender and designation levels.

3.2. Sample Size: Survey was followed at 95% confidence level and 5% confidence interval. Sample size for infinite population was determined using the Morgan formulae on this scale

$$SS = Z^2 \times (p) \times (1-p) / c^2$$

Where,

SS = Sample Size

Z = Z - Value (1.96 for a 95 percent confidence level)

p = Percentage of population picking a choice expressed as decimal

c = Confidence Interval expressed as decimal

Calculations show that sample size of 384 is enough for the study.

3.2. Response Rate: The questionnaire was sent to 4379 people in 118 biomedical institutions online electronically primarily in which 526 questionnaires received were considered for study. Response rate calculated for this study is 12.01%. It is remarkable that acceptable response rates for online questionnaire is far below than the questionnaires collected personally in prints or collected by postal services (20-21).

3.3. Data Collection, Analysis and Calculation: SurveyMonkey online software was used to send the questionnaire and to collect it. For analysis and representing it in graphical and tabular form, the same instrument was applied. For calculations and deriving results, ANOVA and chi-square test were applied for quantitative and qualitative data respectively using Microsoft Excel.

4. Data Analysis

Data is analysed after collection of data to draw meaningful results from the same. Composition of respondents has been described earlier to it.

4.1. Composition of Respondents: Total 526 questionnaires were found relevant for the study responded back from biomedical information users of different age groups, gender, professional fields and designation levels. Largest number of respondents is in age group 26-35 Years (36.7%). The number of respondents decreases afterwards. But the least number of respondents are from 16-25 Years (6.8%) in the survey. Almost three fourths of respondents are males (71.9%), the rest females (Table 4.1.1).

Table 4.1.1: Composition of Respondents based on Age, Gender and Professional Field

Age Distribution (in Years)		Gender Distribution		Professional Field	
16-25	36 (6.8%)	Male	378 (71.9%)	R & D	164 (31.2%)
26-35	193 (36.7%)	Female	148 (28.1%)	Academic	212 (40.3%)
36-45	146 (27.8%)	Total	526	Industry	34 (6.5%)
46-55	96 (18.3%)			Students	116 (22.1%)
56-65	55 (10.5%)			Total	526
Total	526				

Largest number of respondents is Director (PB-3)/Assistant Professor/Scientist – B,C/Equivalent (29.8%) followed by Director (PB-3/4)/Associate Professor/ Scientist-D,E,F/Equivalent (24.7%) and Director (PB-4)/ Professor/Scientist-G,H/ Equivalent (19.4%). Research scholars constitute 18.3% of total respondents. Laboratory assistants/Technician/Nurses/Equivalent and students constitute four percent each of the total number of respondents (Table 4.1.2). The largest number of respondents is from academic field. In this study people with designations of professor, associate professor and assistant professor are taken in academic professional field despite they might be engaged in research and health care services also. Primary professional field of scientists are considered as R&D in the same way. People with designation of doctors, pharmaceuticals, nurses and technicians etc. are classed in industrial field. Considering that way, 40.3% of respondents are from academic field. 31.2% of respondents are from R&D field. 22.1% of respondents are engaged in study and they are either students or research scholars. Number of respondents from industrial fields including hospitals (6.5%) is negligible (Table 4.1.1).

Table 4.1.2: Designation Level Distribution of Respondents

Director(PB-4)/ Professor/ Scientist-G,H/ Equivalent	102 (19.4%)
Director(PB-3/4)/ Associate Professor/ Scientist-D,E,F/ Equivalent	130 (24.7%)
Director(PB-3)/ Assistant Professor/ Scientist-B,C/ Equivalent	157 (29.8%)
Research Scholar	96 (18.3%)
Laboratory Assistant/Technician/Nurse/Equivalent	21 (4.0%)
Student	20 (3.8%)
Total	526

4.2. Purpose of Information Access and Use: In the first question, the respondents were asked about the purpose of information access and use by them. Research works (90.9%) proved prime reasons for making information access and use. Experimentations (45.1%) and decision making (45.5%) are reasons to access information for more than half of respondents. Clinical works (32.7%), preparing

class notes (31.9%) and amusements (23.8%) are the purpose of less than one third of respondents only (Table 4.2). Nurses, laboratory assistants, technicians and students are less interested in research works, experimentations and decision making where class notes and clinical works are larger issues to students for information access and use.

Table 4.2: Purpose of Information access and Use

Options	F (%)
Amusements	115 (23.8%)
Research Works	439 (90.9%)
Class Notes	154 (31.9%)
Experimentations	218 (45.1%)
Clinical Works	158 (32.7%)
Decision making	220 (45.5%)
Others	11 (2.3%)
Total	483 (100.0%)

4.3. Preferred Format of Searching Information: In the present era of digital information storage and communication, use of print resources has been minimized. The second question asked was formulated to know the preference of respondents between print, electronic and both the resources. Use of 'prints only' (selected by 0.2% of respondents) and 'almost prints' (selected by 0.8% of respondents) format of information by a user is very rare as the data collected disclosed. More than half (61.1%) of respondents search information in prints as well as electronic. One third of respondents prefer totally electronic (7.6%) or almost electronic (30.3%) format of information (Table 4.3).

Table 4.3: Preferred Format of Searching Information

Options	F (%)
Prints Only	1 (0.2%)
Almost Prints	4 (0.8%)
Prints as well as Electronic	299 (61.1%)
Almost Electronic	148 (30.3%)
Electronic Only	37 (7.6%)
Total	489 (100.0%)

This all shows that present era do not favour 'prints only' to biomedical professionals and no any library accomplish its services without availability of electronic resources.

4.4. Frequently used Resources among Offline and Online Resources: The study shows that extent of offline resources among total electronic resources is insignificant (4.4% only). The rest 95.6% of respondents use online resources frequently (Table 4.4).

Table 4.4: Frequently used Resources among Offline and Online Resources

Options	F (%)
Offline Resources	21 (4.4%)
Online Resources	453 (95.6%)

However this question does not throw light if online resources are used for searching and reading both. It is remarkable that in a study, **Nicholas, Huntington & Jamali**²² had envisaged that most of the searches on Internet are cursory in nature and reading goes on offline.

4.5. Preferred Format of Information for Different Resources: Respondents were asked their preference between printed and electronic for different resources in a question. Literary books, newspapers/magazines and books/monographs are preferred to be read in print format. At a scale where -1 is kept for response 'print' by all the guys and +1 for 'electronic' by all the guys, these score -0.46, -0.43 and -0.23 that mean clear tendency of these documents to being read print format. TOC alerts, journal articles and reference sources score 0.86, 0.76 and 0.74 that shows these resources are highly preferred in to read in electronic format. It is obvious that these all are serial publications that become available online in electronic format more timely. Patents/designs/specifications/designs, review articles/theses, datasheets/books score 0.58, 0.47 and 0.26 that shows more respondents tend to

read these resources in electronic format (Table 4.5). It is obvious that electronic format of information are preferred for most of the resource types except books and newspapers/magazines.

Table 4.5: Preferred Format of Information for Different Resources

Options	Print (P)	Electronic (E)	E – P	$\frac{E - P}{E + P}$
Toc Alerts	19	262	243	0.86
Journal Articles	17	128	111	0.76
Reference Sources	52	342	290	0.74
Patents/Reports/Standards/specifications	67	250	183	0.58
Review Articles/Theses	98	272	174	0.47
Others	45	92	47	0.34
Data Sheets/Books	120	204	84	0.26
Business Documents	133	149	16	0.06
Books/Monographs	249	156	-93	-0.23
Newspapers/Magazines	266	105	-161	-0.43
Literary Books	242	89	-153	-0.46

4.6. Significant Features of Electronic Format of Information as compared to Print:

There are some features found both in printed and electronic. Some of these are prominent in electronic and some are prominent in printed. 1.0 was assigned if it is prominent in electronic by all of the respondents and 0.0 was assigned if the same is prominent in printed by all the respondents. That mean 0.50 score indicates that the given feature is equally prominent in the both media. To achieve this, responses “Yes” by respondents to the query were assigned 1.0 and “No” to the query assigned 0. “May be” options were assigned by 0.5. Final values are shown in the Table 4.6. ‘Comfort while reading’ is least scored feature for electronic resources. It has scored only 0.08 at the scale stated before. It shows that most of the people feel reading easy in printed at the place of electronic. ‘Authenticity’ valued as 0.38 expresses that larger number of respondents understand the electronic format of information less authentic in comparison to printed. The other

all features are in favour of electronic format of information in which 'easy to search in' has scored (0.96) the highest followed by 'easily available (0.92)' and 'platform to vast information (0.92)'. 'Time save (0.91)' and 'user friendly (0.86)' characteristics have scored after previously mentioned features. 'Easy writing' and 'Less cost' have scored around 0.75 (Table 4.6).

Table 4.6: Significant Features of Electronic Format of Information as compared to Print

Options	Yes (Y)	May Be (M)	No (N)	Y - N	$\frac{Y - N}{Y + M + N}$
Easily Available	473	35	3	470	0.92
Easy to Search in	490	16	3	487	0.96
Comfort while Reading	184	171	146	38	0.08
Easy Writing	315	135	38	377	0.77
Less Cost	395	85	17	378	0.76
Time Save	465	38	4	461	0.91
Platform to vast Information	467	32	3	464	0.92
User Friendly	437	60	4	433	0.86
Authenticity	196	251	38	158	0.38

4.7. Need of Training to Users to Access E-Resources: Number of respondents that need training to access electronic resources - is very less as the results of this survey reveal. Only 16.1% of respondents expressed that they need training to access the information sources where 48.6% of them replied no need of training even partially showing biomedical professionals to be information literate enough (Table 4.7).

Table 4.7: Need of Training to Users to Access E-Resources

Options	F (%)
Training Needed	83 (16.1%)
Training Needed Partially	165 (32.1%)
No Need of Training	250 (48.6%)
Can't Say	16 (3.1%)
Total	514

4.8. Opinion if E-resources minimize use of Traditional Prints: Most of the biomedical information users feel that e-resources have minimized the use of print resources as this study discloses. Proportion of such respondents is three fourths (74.3%) of the total respondents. 18.3% of respondents consider that use of printed has been catalysed positively by the introduction of electronic resources. A few respondents replied that e-resources has neutral effect on print resources (4.3%) or said can't say (3.1%) (Table 4.8).

Table 4.8: Opinion if E-resources minimize use of Traditional Prints

Options	F (%)
Yes – Minimizes	381 (74.3%)
No Effect	22 (4.3%)
No – Maximises	94 (18.3%)
Can't Say	16 (3.1%)
Total	513

4.9. Opinion of Respondents about Impact of Digital Era on Reading: In the previous section, respondents had replied for use status of prints after digital era. In this section, it was tried to know about effect of digital era on reading. More than half (54.9%) of respondents opined that reading has been increased at present. Half of this percentage (25.9%) only proclaims inverse of it i.e. reading to be decreased now. It is a sign of healthy status of reading in the digital era (Table 4.9).

Table 4.9: Opinion of Respondents about Impact of Digital era on Reading

Options	F (%)
Reading has been Decreased	127 (25.9%)
Reading has been Increased	269 (54.9%)
No Effect	47 (9.6%)
Can' Say	47 (9.6%)
Total	490

4.10. Opinion on ICT if it has supported to Information Publishing: Respondents have general opinion that Internet is a strong tool for information publishing at

present. More than half (53.0%) of respondents have expressed that Internet supports to information publication up to 51- 100%. More than one forth (26.1%) has a view that Internet supports to the same up to 26-50% in information publishing. One tenth (9.8%) of respondents think that Internet supports 0-25% only in information publishing. Some respondents (10.6%) have chosen 'can't say'. And negligible number of respondents has opined that Internet does not support in information publishing at all (Table 4.10). It is clear that percentage of respondents having high belief that Internet is supportive to information publishing is higher in proportion and importance of Internet as a tool for information publishing deepens significantly.

Table 4.10 Opinion on ICT if it has supported to Information Publishing

Options	F (%)
Not at All	2 (0.4%)
Yes – up to 25%	49 (9.8%)
Yes – 26-50%	130 (26.1%)
Yes – 51- 100%	264 (53.0%)
Can't Say	53 (10.6%)
Total	498

4.11. Opinion if all the Information needed is available on Internet: The study shows that more than half (55.4%) of respondents feel that the needed all information is available on Internet where 28.6% do not do so. The ratio between them concludes to be 2:1. Negatively we can say that all the things are not available on the Internet (Table 4.11).

Table 4.2.10: Opinion if all the Information is available on Internet

Options	F (%)
Yes	263 (55.4%)
No	136 (28.6%)
Can't Say	76 (16.0%)
Total	475

4.12. Satisfaction of Users with ICT Services in the Libraries: Largest number of respondents is moderately satisfied with the ICT infrastructure and services in the libraries they visit. The percentage of such respondents is more than forty percent. Number of respondents ‘much satisfied’ (23.8%) and ‘extremely satisfied’ (11.9%) cumulatively is somewhat more than that of “satisfied anyhow’ (14.7%) and ‘dissatisfied’ (7.9%). It shows that visit to biomedical libraries is positive in India. However this condition is not far good (Figure 4.12). At a scale of 5 for ‘extremely satisfied’, 1 for ‘dissatisfied’, the average scale reaches to 3.17 only that proves the same.

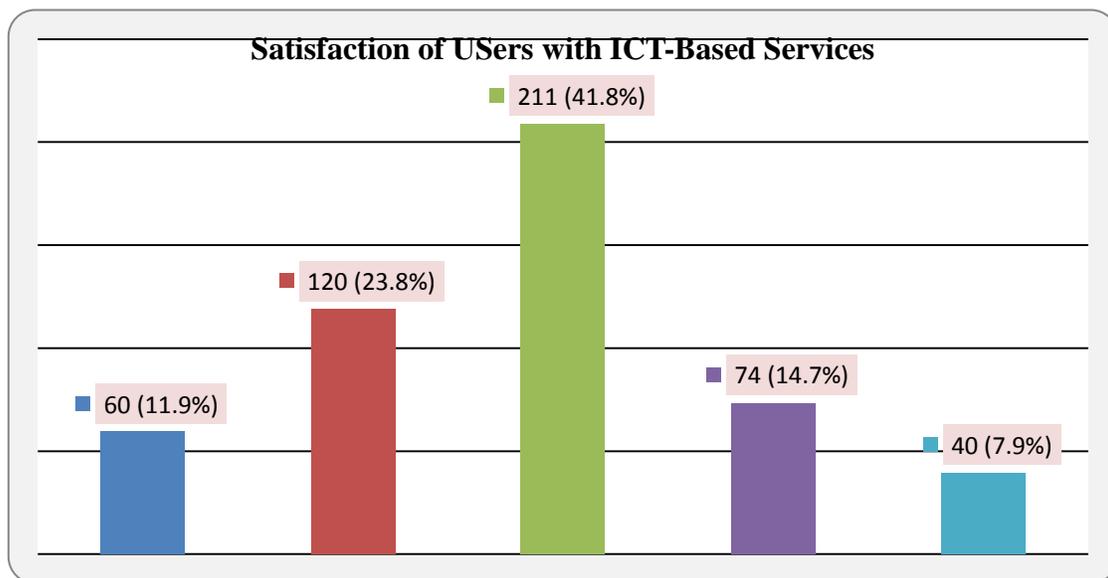


Figure 4.12: Satisfaction of Users with ICT services in the Libraries

4.13. Ranking of Types (Forms) of Information: The study reveals that text is used largest by respondents and sixty three percent of them rank it first among the all forms of information they use. Fifty one percent of respondents use ‘graphs, tables & diagrams’ at second position. Images are kept as third choice by fifty four percent of respondents. Animations are placed at fourth place by nearly seventy percent of respondents. Audio-visual resources are placed at last and fifth position by three fourths of respondents (Table 4.13).

Table 4.13: Ranking of Types (Forms) of Information

Options	1	2	3	4	5	Rating Average
Text	283	83	48	19	17	1.68
Graphs, Tables & Diagrams	83	228	90	35	13	2.26
Images (Photographs)	50	88	244	55	14	2.77
Animations	14	21	30	308	76	3.92
Audio-Video Sources	20	31	39	32	329	4.37

4.14. Age of recently used document: Two thirds (65.2%) of respondents read documents within a week from publishing generally. One fifth (19.2%) of them make use of documents within a month from publishing. Remainder fifteen percent read the documents either within a year from publishing or more than a year after publishing. The students read old published documents in larger extent as textbooks read by them bears well established theories and facts that is not possible in currently published information. People at the level of technicians/nurses/assistant follow the students in this regard (Figure 4.14).

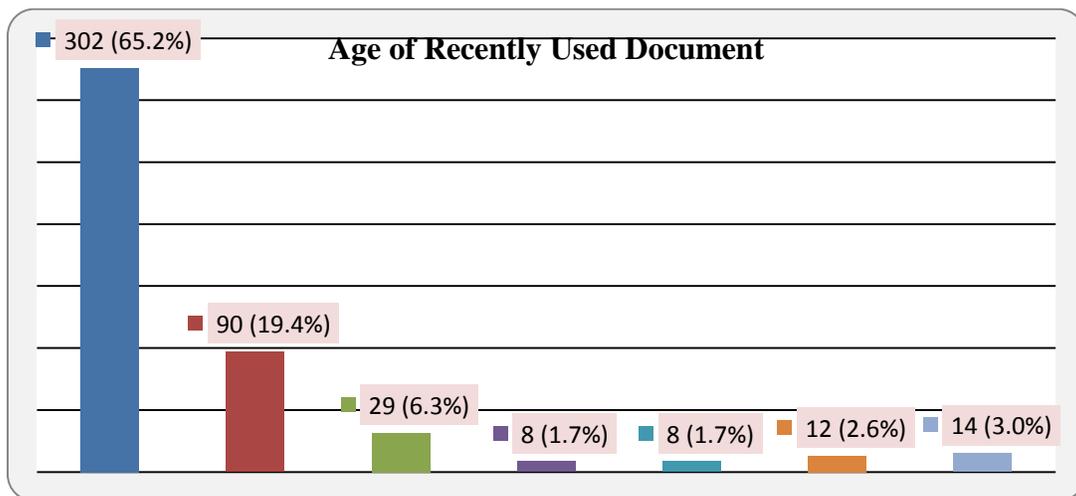


Figure 4.14: Age of Recently used Document

4.15. Ranking of Online Sources preferred by users: E-journals are most preferred e-resources used by biomedical information users as the survey discloses. 265 (50.5%) people have ranked it first among the e-resources they access. E-books are placed at the second position and 138 people only have kept it at the first place. Conference proceedings are ranked third but largest numbers of 131 people have kept it at fourth position. Review articles are placed at fourth most read online documents but surprisingly 155 people have kept it at seventh position. Reference sources are at the position of fifth and 150 people have kept it at the same position. Newspapers and magazines are on sixth position, very close to average rating of reference sources positioned at fifth place. Largest numbers of users have kept them at fifth place. Patent/Standards/Specifications/Design and business documents are placed at seventh and eighth by position at average respectively and largest number of users have kept it at the same position (Table 4.2.2). E-journals are found as largest used electronic documents in several other studies (Parameshwar & Patil, 2009; Babu, Sarada & Ramaiah, 2010) also.

Table 4.15: Ranking of Online Sources preferred by Users

Options	1	2	3	4	5	6	7	8	Rating Average
E-journals	265	102	46	19	2	2	1	3	1.67
E-books	81	138	85	80	31	19	4	1	2.82
Conference Proceedings	8	35	125	131	102	31	5	2	3.93
Review Articles	53	95	83	27	10	11	155	6	4.20
Reference Sources	11	41	49	50	150	123	14	1	4.63
Newspapers and Magazines	20	19	37	117	121	89	26	11	4.65
Patents/Standards/Specifications	1	8	13	14	21	163	214	5	6.23
Business Documents	1	2	2	2	3	2	21	407	7.84

4.16. Proportion of Audio-Video resources among all used Resources: Audio-video resources are estimated to be used less than five percent by forty percent of respondents. Thirty percent of respondents use it by 5-10 percent. Eleven percent of users make no any use of these resources (Table 4.16).

Table 4.16: Proportion of Audio-Video resources among all used Resources

Options	F (%)
Almost Zero	52 (11.6%)
Up to 5%	172 (38.2%)
50-10%	132 (29.3%)
More than 10%	94 (20.9%)
Total	450

4. Major Findings

Based on above analysis and discussions, following are the main findings of the study:

1. Easy in search, easily availability, platform to vast information, users friendliness, time save, less cost, easy writing are features of electronic resources where authenticity and easy in reading are problems related to the same.
2. Larger number of the respondents (48.6%) does not need training at all to access e-resources. Only 16.1% of respondents need training to make use of ICT services in the libraries. 32.1% of them need training partially.
3. Most (74.3%) of the people think that use of e-resources minimizes the use of prints.
4. Satisfaction rate with ICT services tends towards to be positive.
5. Most respondents agree that the Internet has supported into publishing the information. 53.0% of them consider that Internet has supported to

information publishing up to 51-100% where 0.4% only of them have stated that Internet is not supporting in information publishing.

6. Research works (90.9%) and getting information (64.2%) is the prime reasons to information access and use.
7. More than half of readers search the information in electronic format as well as in print. Only print is the sources of information for almost zero persons.
8. Online resources are accessed by almost all biomedical information users. Less than five percent users have reported that offline is the prime source of information to them.
9. Books, literary works, newspapers and magazines are preferred in print to read yet.
10. Information is available on the Internet commonly for biomedical information users.
11. More than half (54.9%) of respondents accept that reading has been increased in digital era.
12. Text is most read followed by graphs, tables & diagrams. Images are on the third place.
13. Documents published recently are read by most of the readers. 65.2% of respondents read documents that have been published one week ago while 19.4% of them read that has been published one month before.
14. E-journals, E-books, and conference proceedings are the most attended e-resources.
15. Only one fifth (20.9%) of respondents use more than 10 % of AV resources.

5. Discussion:

The present study shows that electronic formats of information are being preferred by biomedical professionals. However 'text' is widely used for reading and study at the place of multimedia. Reading including online browsing has been estimated to be increased after Internet era. The study derives results similar to some previous

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studies and sometimes differs also. Specialization of respondents in a particular field sometimes seems a source of differences and sometimes procession of times might prove a factor. It is obvious that this study is limited to information literate professionals of biomedical sciences. Research works were found a prominent reason to information access by scientists in Tennessee (**Tenopir & King, 1998**). But it did not proved true for nurses in Nigeria (**Komolafe & Onatola, 2008**). Designation-wise comparison confirms that designation play a vital role for searching information for research purposes. Age has also been proved a factor by the present study in Indian scenario. The study does not confirm the findings by **Jowkar & Dehghani (2006)** that use of print journals is more than electronic. The study carried by **Nikkar & Mooghali (2010)** later coincidences with this study where they had observed that acceptance of electronic journals is being increased among the users and depends on the users specialties too. Findings by **Monopoli Nicholas, Georgain & Korfiat (2002)** about features of electronic resources that ease to use, easily availability and ability to save are most important reason to use e-resources is confirmed by the study. The study derives different result for requirement of training/orientation than previous studies in India (**Syed Mohammad Ghaemi Talab & Masoumeh Tajafari, 2012; Sharma, 2009; Parmeshwar & Patil, 2009; Pujar & Sangam, 2007; Nikam & Prabodhini, 2007; Satyanarayana & Mishra, 2001; Moorthy & Karisidappa (2001)** in other subjects. **Monopoli et al. (2002)** had concluded that total time spent on reading on paper has been decreased, but faculties read more articles now-a-days. It supports the view of this survey that digital era has positive impact on reading. Earlier to this, **Tenopir & King (1998)** had observed that total time spent on the reading has remained constant during 1977 to 1998. **Satyanarayan & Mishra (2001)** explored that 40 users among 50 users use the Internet in Central Library, Lucknow University and out of these 10 percent of them only could not find relevant information search. The finding is in not complete coincidence from this study. It is possible that biomedical professionals concerned with technical information - do not get all the information on the Internet. Positive satisfaction level of biomedical professionals from library ICT infrastructures are in

contrary to the findings by **Mohammad Haneefa** (2007) for special libraries in Kerala.

6. Suggestions and Recommendations:

Based on the above findings and discussions it is clear that online availability of information has eased the biomedical professionals to get the information as well as publishing and communicating the information. ICT infrastructure of biomedical libraries seems satisfactory in India; however this satisfaction is moderate only. Total reading seems to be increased as opined by more than half of respondents. Use of texts appears prominent in present era too. Bearing all this findings, it is suggested for biomedical libraries that:

1. Print Format of information should not be ignored in the biomedical libraries as text is the prime form of information at this time too which is preferred to be read in prints. The study also discloses that reading on print is favoured by users yet.
2. Reprography services and services establishing communications with its distant users might increase usability of library resources. Less frequency of library visits does not mean that library services are not needed to the professionals in India.
3. Biomedical libraries increase its co-operation between them by making information systems, consortia and loan services etc.

6. **Originality/Value:** This paper throws light on wider acceptability of electronic resources at the same time conserved importance of printed resources for reading. The study is based on a single knowledge domain but non-single level and type of professionals. Further depth studies are essential as attitudes of respondents show differences after comparisons somewhere.

8. Conclusions:

At present time of electronic dominance, printed have not lost significance for reading and study. High preference of literary books, textbooks, magazines and newspapers in printed format clarifies the same. Texts are ranked top by a large number of users (283/450 respondents) and only one fifth of respondents use AV resources more than twenty percent of all used resources by them. Electronic resources are easy in searching and writing, but it is poor platform for reading. Authenticity of them is also less than print resources. Respondents consider that use of prints has been decreased in digital era, but reading seems to be increased in present times. More than half of respondents read in print as well as in electronic format of information. Satisfaction rates seem moderately positive for ICT based services in libraries. Larger numbers of them do not need training at all to access the e-resources.

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